
A TRIP
THROUGH TIME
WITH
LANDSAT 9

1
00:00:06,550 --> 00:00:04,710
from 438 miles above earth's surface the

2
00:00:09,030 --> 00:00:06,560
newest landsat satellite will collect

3
00:00:11,190 --> 00:00:09,040
data so detailed it can detect both

4
00:00:13,990 --> 00:00:11,200
natural and human-caused changes to the

5
00:00:18,070 --> 00:00:15,910
but what really makes landsat unique is

6
00:00:21,029 --> 00:00:18,080
the half century of data an unbroken

7
00:00:23,509 --> 00:00:21,039
chain of observations over five decades

8
00:00:26,630 --> 00:00:23,519
let's take a look at how we got here

9
00:00:29,189 --> 00:00:26,640
1966 the u.s geological survey proposes

10
00:00:31,029 --> 00:00:29,199
a satellite to study earth's land masses

11
00:00:33,590 --> 00:00:31,039
but what would that look like

12
00:00:37,270 --> 00:00:33,600
over the next few years usgs and nasa

13
00:00:40,709 --> 00:00:39,110

1970

14
00:00:43,190 --> 00:00:40,719
nasa gets the green light to build an

15
00:00:44,950 --> 00:00:43,200
earth resources technology satellite an

16
00:00:47,750 --> 00:00:44,960
experiment to study and monitor our

17
00:00:50,069 --> 00:00:47,760
planet's land surface from space

18
00:00:52,470 --> 00:00:50,079
launched in 72 this was the first

19
00:00:54,150 --> 00:00:52,480
digital data of earth repeated at

20
00:00:56,150 --> 00:00:54,160
regular intervals with geometric

21
00:00:57,500 --> 00:00:56,160
fidelity to allow comparison between

22
00:00:59,029 --> 00:00:57,510
observations

23
00:01:01,430 --> 00:00:59,039
[Music]

24
00:01:03,510 --> 00:01:01,440
this changed how we drew maps tabulated

25
00:01:05,830 --> 00:01:03,520
agricultural production and assessed

26
00:01:08,870 --> 00:01:05,840
damage after disasters

27
00:01:10,630 --> 00:01:08,880
in 1975 nasa launched a second satellite

28
00:01:12,310 --> 00:01:10,640
similar to the first

29
00:01:13,590 --> 00:01:12,320
now they were collecting twice as much

30
00:01:15,590 --> 00:01:13,600
data

31
00:01:18,149 --> 00:01:15,600
with landsat 3 replacing the aging

32
00:01:21,590 --> 00:01:18,159
original in 78 focus shifted to the

33
00:01:23,670 --> 00:01:21,600
advanced technology planned for the 80s

34
00:01:26,310 --> 00:01:23,680
the thematic mapper instrument launched

35
00:01:28,950 --> 00:01:26,320
on landsat 4 in 1982 and on its twin

36
00:01:29,910 --> 00:01:28,960
landsat 5 and 84 was a major step

37
00:01:31,910 --> 00:01:29,920
forward

38
00:01:33,990 --> 00:01:31,920

collecting seven different wavelengths

39
00:01:35,990 --> 00:01:34,000
at better ground resolution and with

40
00:01:37,749 --> 00:01:36,000
higher precision this was the beating

41
00:01:41,190 --> 00:01:37,759
heart of the satellite and became the

42
00:01:43,190 --> 00:01:41,200
workhorse for a generation of scientists

43
00:01:46,230 --> 00:01:43,200
for the first time landsat data had

44
00:01:51,990 --> 00:01:46,240
three visible bands red green and blue

45
00:01:55,670 --> 00:01:53,910
with the addition of shortwave infrared

46
00:01:57,510 --> 00:01:55,680
wavelengths the data could better

47
00:01:59,830 --> 00:01:57,520
highlight flooded areas

48
00:02:03,590 --> 00:01:59,840
mineral deposits and burn scars from

49
00:02:07,270 --> 00:02:05,429
the thermal bands were also upgraded

50
00:02:11,029 --> 00:02:07,280
allowing individual farm fields to be

51
00:02:15,030 --> 00:02:12,790
the sixth landsat was intended to be

52
00:02:17,830 --> 00:02:15,040
another big step forward but it never

53
00:02:20,070 --> 00:02:17,840
reached orbit after launch in 1993

54
00:02:21,990 --> 00:02:20,080
plans immediately began for landsat 7

55
00:02:23,190 --> 00:02:22,000
which would carry an even more improved

56
00:02:25,430 --> 00:02:23,200
sensor

57
00:02:26,949 --> 00:02:25,440
at the time the enhanced thematic mapper

58
00:02:28,869 --> 00:02:26,959
plus was the most stable earth

59
00:02:29,750 --> 00:02:28,879
observation instrument ever sent into

60
00:02:31,430 --> 00:02:29,760
orbit

61
00:02:33,110 --> 00:02:31,440
and the calibration could be updated

62
00:02:35,030 --> 00:02:33,120
while in space

63
00:02:37,430 --> 00:02:35,040

for the first time we had an instrument

64
00:02:39,589 --> 00:02:37,440
robust enough to collect lots of data

65
00:02:41,190 --> 00:02:39,599
and we had a plan to thoroughly record

66
00:02:43,430 --> 00:02:41,200
the entire globe

67
00:02:44,470 --> 00:02:43,440
landsat 7 was put to work mapping coral

68
00:02:45,670 --> 00:02:44,480
reefs

69
00:02:47,670 --> 00:02:45,680
and even produced the first

70
00:02:52,550 --> 00:02:47,680
high-resolution natural color map of

71
00:02:56,470 --> 00:02:54,070
improvements to the thermal bands on

72
00:02:59,110 --> 00:02:56,480
landsat 7 allowed states and counties to

73
00:03:01,270 --> 00:02:59,120
gauge how much water was used by crops

74
00:03:03,030 --> 00:03:01,280
this helps them manage water resources

75
00:03:05,750 --> 00:03:03,040
efficiently

76
00:03:07,990 --> 00:03:05,760
an important milestone occurred in 2008

77
00:03:10,309 --> 00:03:08,000
when the usgs made the data available to

78
00:03:11,990 --> 00:03:10,319
download for free

79
00:03:13,830 --> 00:03:12,000
users were able to get the data they

80
00:03:16,229 --> 00:03:13,840
needed and not just what they could

81
00:03:18,149 --> 00:03:16,239
afford it really unlocked a ton of

82
00:03:23,750 --> 00:03:18,159
innovation and created about two billion

83
00:03:27,430 --> 00:03:25,830
the modern era of landsat observations

84
00:03:29,589 --> 00:03:27,440
began with the launch of landsat 8 in

85
00:03:31,430 --> 00:03:29,599
2013

86
00:03:33,670 --> 00:03:31,440
having a push broom style sensor on

87
00:03:36,470 --> 00:03:33,680
landsat 8 was a big improvement over the

88
00:03:38,630 --> 00:03:36,480

older scanning sensor

89
00:03:40,630 --> 00:03:38,640
the landsat 8 ground system that usgs

90
00:03:42,070 --> 00:03:40,640
runs is capable of receiving a lot more

91
00:03:44,789 --> 00:03:42,080
data than before

92
00:03:47,350 --> 00:03:44,799
we're downloading over 725 scenes each

93
00:03:49,270 --> 00:03:47,360
day that just wasn't remotely possible

94
00:03:51,670 --> 00:03:49,280
until landsat 8.

95
00:03:53,670 --> 00:03:51,680
the two european sentinel 2 satellites

96
00:03:55,509 --> 00:03:53,680
were designed to mesh with landsat so

97
00:03:57,589 --> 00:03:55,519
that users can treat data from all the

98
00:03:58,470 --> 00:03:57,599
satellites as if it came from one single

99
00:04:00,229 --> 00:03:58,480
source

100
00:04:04,710 --> 00:04:00,239
now we get observations every two or

101
00:04:09,750 --> 00:04:07,830
2021 is the launch of landsat 9 the next

102
00:04:11,509 --> 00:04:09,760
step forward

103
00:04:13,670 --> 00:04:11,519
it will collect the best data ever

104
00:04:15,509 --> 00:04:13,680
recorded by a landsat satellite while

105
00:04:18,550 --> 00:04:15,519
still integrating seamlessly with the

106
00:04:23,030 --> 00:04:21,430
since the early 1970s landsat satellites

107
00:04:24,870 --> 00:04:23,040
have allowed us to better manage our

108
00:04:26,629 --> 00:04:24,880
resources

109
00:04:28,550 --> 00:04:26,639
landsat data has enabled countless

110
00:04:30,230 --> 00:04:28,560
innovations and will let us track the

111
00:04:37,700 --> 00:04:30,240
effects of climate change into the